

STATISTICS FINAL EXAM PRACTICE TEST

The information below will be used for the entire Statistics exam. Add data are on a tear-off page in the back of the exam for reference.

Ms. Raskin found the GPA quality points for the first quarter for her Alpha Statistics class.

(Note: A = 4pts, B = 3pts, etc.) They are as follows:

0, 0, 0, 1.7, 2, 2, 2, 2, 2.3, 2.3, 2.3, 2.3, 2.7, 2.7, 2.7, 2.7, 3, 3, 3.3, 3.3, 4

- 1) Find the **median** and **IQR** of these data. (2pts)
- 2) Find the **mean** of these data. (2pts)
- 3) The **standard deviation** of these data is 1.0703. What does this tell you about spread of the data? (2pts)
- 4) Make a **boxplot** of these data. (4pts)

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5) Make a **histogram** of these data. (4pts)

6) Describe your histogram using SOCS (**s**hape, **o**utliers, **c**enter, and **s**pread). (2pts)

7) Are any of these grades **outliers**? If so, explain why they are. If not, explain why none are outliers. (2pts)

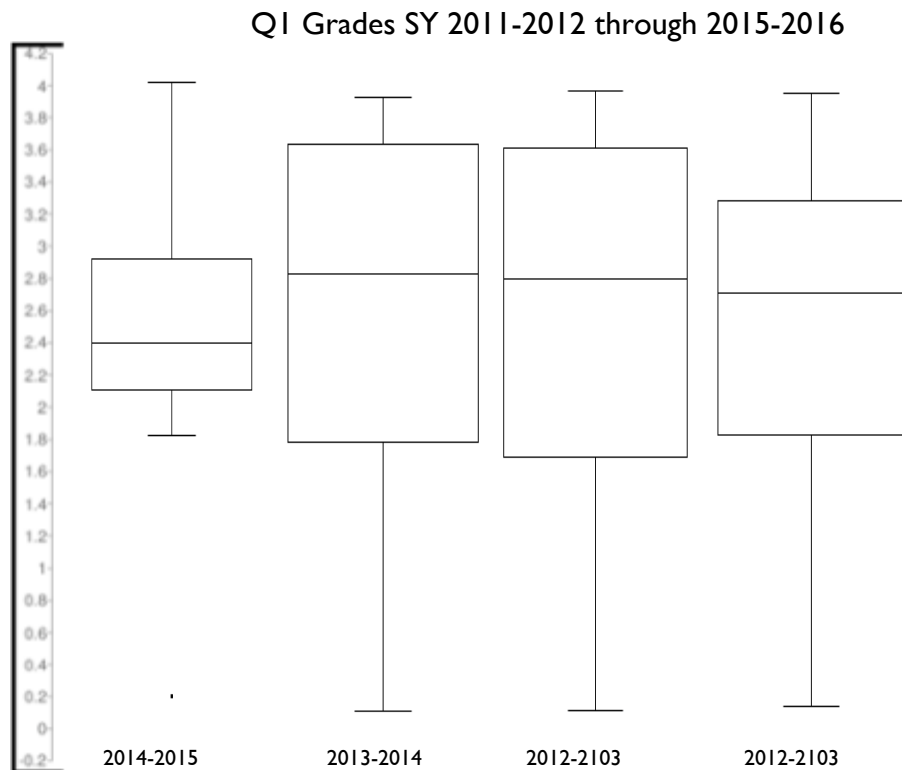
8) Are earning a 2.3 GPA point grade and a 3.3 GPA point grade **mutually exclusive/disjoint**? Why or why not? (1pt)

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- 9) Ms. Raskin randomly selects one student from the class to be in charge while she finds extra calculators for the seniors who didn't bring theirs. Which student is **more likely** to be chosen: a student whose grade earned 2.3 GPA quality point or a student whose grade earned 3.3 quality points? **Why?** (2pts)
- 10) **What is the probability** that the first student she chooses was a student whose grade earned 2.3 quality GPA point? (2pts)
- 11) There are a lot of students in the class, so Ms. Raskin selects a second student to help be in charge. What is the probability that the first student had a grade of 2.3 quality point **AND** the second student had a grade that earned 3.3 quality points? Complete the **tree diagram** to solve this problem. (3pts for the diagram, and 2pts for the answer)
- 12) 16 students earned below 3 GPA quality points. 15 students attended tutorial. Only 10 students did both. How many students earned below 3 GPA quality points and did not attend tutorial? Draw a **Venn diagram** to solve this problem. (3pts for the diagram and 2pts for the answer)

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The parallel boxplots below show the QI grades for school years 2011-2012 through 2015-2016. (This is also on the tear-out sheet on the back.)



13) Choose two measures of SOCS on which to compare **all** of the five boxplots. (4pts)

14) Which class had an **outlier**? What does this mean? (2pt)

15) How can a grade of 4 GPA points (a grade of A) be an **outlier** in one class and a **maximum** in another class? (This did not happen in this case but is a hypothetical event.) (3pts)

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16) Compare the **medians** of the distributions. Make sure to tell what this means about the classes. (2pts)

17) Are any distributions **skewed**? Which direction (toward the lower grades or toward the higher grades)? What does this tell you about the grades in those classes? (2pts)

18) **Compare** the **IQR** of 2014-2015 with the **IQR** of 2012-2013. Make sure to tell what this means. (2pts)

19) On average, which class had the highest grades? Explain why you chose this class. (2pts)

20) Ms. Raskin thought that the students' **Q1 grade** could predict their **final exam grade**. Identify the **explanatory variable** in this relationship. (1pt)

21) Identify the **response variable** in this relationship. (1pt)

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The table below shows the QI GPA points versus the YI GPA points by student.

QI GPA Points	Final Exam GPA Points
2.3	0
2.7	1
0	0
2	1
2.7	0
2.7	3
4	3.7
2	0
0	0
2.3	2.3
2	0
3	2.3
0	2.7
3.3	2.7
2.7	0
3	0
2.3	0
2	0
2.3	1.7
1.7	0
3.3	3.7

22) Make a **scatterplot** of these data. (4pts)

23) Describe your data **in context** using **direction**, **form**, and **strength**. (3pts)

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- 24) The **correlation** of these data is $r = 0.3921$. What does this tell you about the **relationship** between Q1 and final exam grades? (2pts)
- 25) The **least square regression line (LSRL)** for these data is $\hat{y} = 0.023 + 0.51x$. Another way to say this is that $\widehat{\text{exam grade}} = 0.023 + 0.51(\text{Q1 grade})$. **Why is there a “^” over the “y”** (or over the “exam grade”)? (2pts)
- 26) **Draw** this line on your scatterplot. (1pts)
- 27) Interpret the **slope** in **context**. What does this number mean for this line? (3pts)
- 28) Interpret the **y-intercept** in **context**. What does this number mean for this line? (3pts)
- 29) One student who earned 0 GPA quality points in Q1 worked very hard and earned 2.7 GPA quality points for the exam. What is this student's **residual**? (2pts)

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30) What can you say about the YI grade of a student whose **residual** is **negative**? (2pts)

31) One student notices that her grade had a **negative residual** but a **positive z-score**.

a. What does a **negative residual** tell you about her score? (2pt)

b. What does a **positive z-score** tell you about her score? (2pt)

c. If you could have only one of the following in this situation: a positive residual or a positive z-score, which would you choose? Make sure that you can explain your choice. (3pts)

32) Ms. Smith asks Ms. Raskin to look at the students' grades in relation to their English grades. She wonders why the students who earn good grades in English also earn good grades in Statistics. She believes that earning good grades in English **causes** students to earn good grades in Statistics. Can she determine this? Why or why not? (2pt)

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33) Ms. Smith asks Ms. Raskin to perform an experiment to see if calling home for class tardies reduces the number of tardies **in the entire school** (middle and upper). Which would be the optimal design/type of experiment to run: **randomized controlled**, **blocked**, or **matched pairs**? (2pt)

34) Explain how you would set up an experiment to determine if calling home will reduce the number of class tardies. You may draw a diagram to help, if you want. (4pts)

35) What are the **three principles of experimental design** that Ms. Raskin must follow? (3pts)

I.

II.

III.

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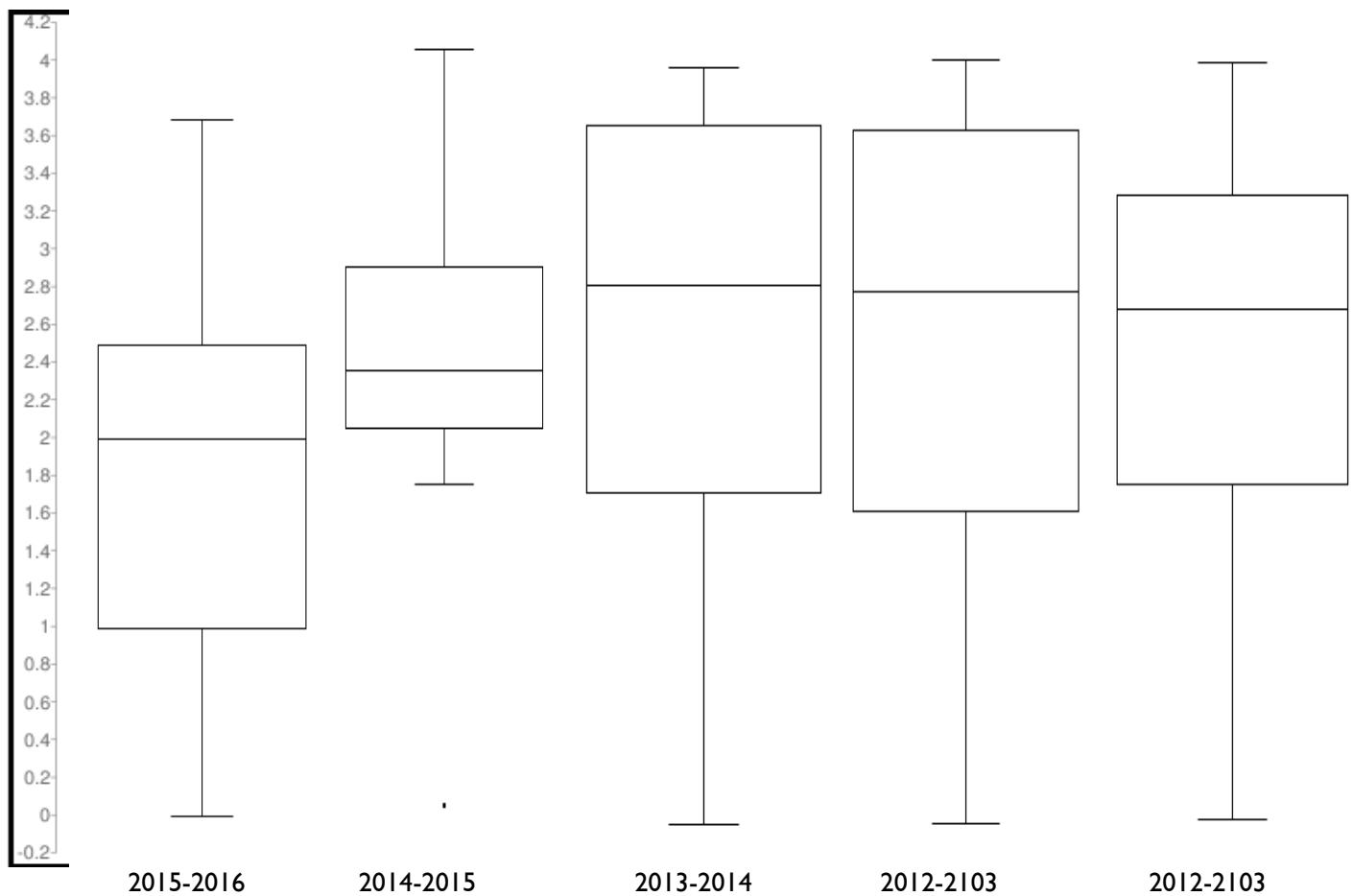
DATA:

Ms. Raskin found the GPA quality points for the first quarter for her Alpha Statistics class.

(Note: A = 4pts, B = 3pts, etc.) They are as follows:

0, 0, 0, 1.7, 2, 2, 2, 2, 2.3, 2.3, 2.3, 2.3, 2.7, 2.7, 2.7, 2.7, 3, 3, 3.3, 3.3, 4

Q1 Grades SY 2011-2012 through 2015-2016



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The table below shows the QI GPA points versus the YI GPA points by student.

QI GPA Points	YI GPA Points
0	1
0	1
1	2.7
1	0
1	1
1	0
1	2
1	1.7
1	2.3
1	2
1.7	2.3
1.7	2.3
2	2
2	2.7
2.3	3
2.3	2
2.3	0
2.3	2.3
2.3	2.7
2.7	1
2.7	3
2.7	2.7
3	4
3.3	3.3
3.7	3